COMPARISON OF A POLARIMETRIC SCATTERING AND EMISSION MODEL WITH OCEAN BACKSCATTER AND BRIGHTNESS MEASUREMENTS

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This paper investigates the theoretical scattering modelling of sea surfaces for polarimetric remote sensing of near-surface ocean wind vectors. A two-scale polarimetric scattering and emission model is developed to interpret existing active and passive remote sensing microwave signatures of sea surfaces. Theoretical backscattering coefficients are compared with the SASS geophysical model function and aircraft scatterometer data to verify the accuracy of the two-scale model. Furthermore, it is found that model-predicted azimuthal modulations of Stokes parameters of thermal radiation agree well with the SSM/I geophysical model function, aircraft Ku-, C-, and Ka-band radiometer data at nadir incidence (Etkin et. al., IGARSS, 1991), and aircraft polarimetric K-band radiometer data collected at the incidence angles of 30, 40, and 50 degrees (Yueh, Wilson, Nghiem, Li, and Ricketts, IGARSS, 1994). The results provide strong indication that the azimuthal modulations observed in microwave backscatter as well as emission data could be responsible by the same anisotropic directional surface features caused by wind forcing.